

NHDOT SPR2 PROGRAM

RESEARCH PROGRESS REPORT

Project # SPR 26962W		Report Period Year 2020 <input type="checkbox"/> Q1 (Jan-Mar) <input type="checkbox"/> Q2 (Apr-Jun) <input checked="" type="checkbox"/> Q3 (Jul-Sep) <input type="checkbox"/> Q4 (Oct-Dec)	
Project Title: Log Jam Monitoring			
Project Investigator: Tom Ballestero Phone: (603) 862-1405		E-mail: tom.Ballestero@unh.edu	
Project Start Date: May 1, 2019	Project End Date: April 30, 2022	Project schedule status: <input type="checkbox"/> On schedule <input type="checkbox"/> Ahead of schedule <input checked="" type="checkbox"/> Behind schedule	

Brief Project Description:

Extreme bank erosion along Route 16 in Errol is to be stabilized using an engineered log jam (ELJ). This is the first installation of an ELJ by NH DOT, and as such NH DOT is interested in the benefits of the structure pertaining to performance, habitat, and costs. The project shall be monitored for three years, including eight months of pre-construction monitoring and two years of post-construction monitoring. Monitoring activities are to cover hydraulic, structural, flora, and fauna; in addition, the monitoring provides inspection information to DOT to assess any need for maintenance or repairs. The ultimate objective of the project is to document all salient aspects of ELJs relative to road planning, permitting, construction, and maintenance, plus documenting stream system changes resulting from the ELJ.

Progress this Quarter (include meetings, installations, equipment purchases, significant progress, etc.):

When the proposal was written, the original ELJ project construction was planned for summer 2019, however that was pushed back until summer 2020. Road construction started the end of June 2020 and the ELJ construction was pushed back to summer 2021, however recently the contractor indicated log jam construction to start in late-October 2020. As such, in order to obtain two years of post-construction monitoring, the project end date will need to be extended to April 2023. In addition, this will require one more year of monitoring which will require additional funding. It is recommended to wait on estimating funding needs until the end of the summer 2021 field season.

Efforts accomplished since the last report include: a second survey of the site at both the failing bank site and bathymetry within the model domains; processing of the most recent surveys; reprocessing 2019 surveys according to recent revelations; collecting and processing of transducer data from four locations; synthesizing model boundary conditions using seven sources calibrated to the transducer data; and performing 12 modeling simulation runs for a variety of boundary condition scenarios.

Pending the UNH June 2020 CCOM bathymetry survey, it was realized that some sonar bathymetric points around the shoreline are 'noise' and not actually representative of the site bathymetry – this resulted in the re-processing of the 2019 bathymetry to have similar errant points removed and the final 2019 combined surface rebuilt. Relations between flows and water elevations at the site were developed and calibrated from multiple sources for annual and seasonal periods. Compared to natural river systems, the relationship between flows and water stages at the site is almost exclusively reversed; high flows generally occur at lower water stages than at times of low-flow. In the spring, the reservoir is lowered in anticipation of spring rain and snowmelt. At times, spring events cause extremely high flows, when the water levels are far below a stage where any vegetation can grow. During the summer and fall, most rainfall events are captured and stored for slow release to Berlin by the Azischohos reservoir. The relation between seasonal hydrology and hydraulics were used to inform 12 steady model scenarios for a variety of flows (upstream boundary condition) and water stages (downstream boundary conditions). Using long-term gage records, the three most extreme events observed in the past 50 years were also modeled as unsteady scenarios. These model simulations employ the pressure transducer data for calibration.

Items needed from NHDOT (i.e., Concurrence, Sub-contract, Assignments, Samples, Testing, etc.):

At this writing with the ELJ construction in sight, no items are needed from NHDOT. T

Anticipated research next three(3) months:

In the next quarter, we plan to: retrieve pressure transducers and possibly coordinate with the hydropower operator to set the transducers at a very fine time step to monitor system changes surrounding dam operations; continue modeling efforts; download game camera data from across the river from the ELG and insert an empty SD storage card; deploy underwater

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GoPro cameras for a few hours; and continue to review the hours of GoPro video to estimate underwater bank fauna. Interpretation of these images could use the assistance of USFW&S and NHF&G TAG members for identification.

Circumstances affecting project:

The construction delay affects project timing, aside from the delay in the schedule, having more pre-construction data is actually a good thing as far having a solid pre-construction database with which to compare to post construction data. The UNH COVID shut down did not affect this project.

Budget, scope, and timing are all on schedule.

Tasks (from Work Plan)	Planned % Complete	Actual % Complete
Task 1 Kick off meetings and information gathering	100% complete	100% complete
Task 2 (in the fifth quarter, proceeding as planned)	80%	67%